

## The role of higher education institutions in developing human skills to promote entrepreneurship and innovation

A study from the point of view of students of the Faculty of Economics and Political Science and the Faculty of Engineering, Universities of Tripoli and Misurata. Libya

OMELSAAD AHMED HAMUDA

Business Administration Department, Faculty of Economics  
and Political Science. Misurata University  
*Om.hamuda@eps.misuratau.edu.ly*

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### Abstract

This study examines the role of higher education institutions in fostering human skills for entrepreneurship and innovation among students in Libya. Specifically, it focuses on students from the Faculties of Economics and Political Science and Engineering at the Universities of Tripoli and Misurata. The objectives include assessing entrepreneurship and innovation education, identifying essential human skills, evaluating program effectiveness, and exploring student perceptions. A total of 627 participants completed an online questionnaire distributed electronically. The findings highlight the significant role of higher education institutions in nurturing human skills for entrepreneurship and innovation. The study confirms hypotheses relating to the positive and significant relationships between higher education institutions and human skills (H1), human skills and entrepreneurship/innovation (H2), while the relationship between higher education institutions and entrepreneurship/innovation was relatively weaker (H3). The study provides valuable insights for policymakers, practitioners, and higher education institutions to enhance entrepreneurship and innovation education in Libya.

**Keywords:** Higher education institutions, Human skills , Entrepreneurship , Innovation , University of Tripoli , University of Misurata, Libya.

## دور مؤسسات التعليم العالي

### في تنمية المهارات البشرية لتعزيز روح ريادة الأعمال والابتكار

دراسة من وجهة نظر طلاب كلية الاقتصاد والعلوم السياسية وكلية الهندسة

في جامعتي طرابلس ومصراته. ليبيا

أم السعد أحمد حمودة

om.hamuda@eps.misuratau.edu.ly

قسم إدارة الأعمال، كلية الاقتصاد والعلوم السياسية، جامعة مصراته

ORCID: (X 320-6179-0002-0000)

### الملخص

تستكشف هذه الدراسة دور مؤسسات التعليم العالي في تعزيز المهارات البشرية المرتبطة بروح ريادة الأعمال والابتكار بين الطلاب في ليبيا. وتركز بشكل خاص على طلاب كليات الاقتصاد والعلوم السياسية والهندسة في جامعتي طرابلس ومصراته. تشمل الأهداف التقييم التعليمي في مجال ريادة الأعمال والابتكار، وتحديد المهارات البشرية الضرورية، وتقييم فعالية البرامج، واستكشاف تصورات الطلاب. شارك في الدراسة 627 مشاركاً أكملوا استبياناً إلكترونياً تم توزيعه عبر الإنترنت. تؤكد النتائج الدور الهام لمؤسسات التعليم العالي في تنمية المهارات البشرية المرتبطة بروح ريادة الأعمال والابتكار. تدعم الدراسة الفرضيات المتعلقة بالعلاقات الإيجابية والمعنوية بين مؤسسات التعليم العالي والمهارات البشرية (H1) و بين المهارات البشرية ودور الريادة الابتكار (H2) ، بينما كانت العلاقة بين مؤسسات التعليم العالي وروح الريادة والابتكار لفرضية (H3) أضعف نسبياً ، كما تقدم الدراسة رؤى قيمة لوضعي السياسات بمؤسسات التعليم العالي لتعزيز التعليم في مجال ريادة الأعمال والابتكار في ليبيا.

**الكلمات المفتاحية :** مؤسسات التعليم العالي، المهارات البشرية، ريادة الأعمال، الابتكار، جامعة

طرابلس، جامعة مصراته، ليبيا.

## 1. Introduction

Higher education institutions play a crucial role in developing human skills to foster entrepreneurship and innovation within societies. When it comes to fields such as economics, politics, and engineering, nurturing entrepreneurial and creative skills among students can be a decisive factor in achieving progress and economic growth.

Institutions of higher education in any country are considered the basic base that leads to cognitive, economic and social development. Higher education institutions have undergone a radical transformation through the ages; It brought about a revolution from the stage of traditional education that prevailed in the fifteenth century to the stage of research in the seventeenth century and then to the stage of community service during the past decades. These successive stages have been achieved as a result of these efforts, the most prominent of which is instilling a culture of entrepreneurship and innovation in higher education institutions. (Etzkowitz , 2004).

This study aims to explore the role of higher education institutions in developing human skills that promote entrepreneurship and innovation, from the perspective of students at the Faculty of Economics and Political Science and the Faculty of Engineering at the Universities of Tripoli and Misurata in Libya. The study seeks to examine students' opinions regarding the quality of education they receive and the extent to which they acquire entrepreneurial and innovative skills during their studies in these faculties.

Libya, as a developing country, is among nations that strive to enhance their economic and innovative capabilities. Therefore, understanding the role of higher education institutions in fostering entrepreneurship and innovation can have a significant impact on the development and growth of society. This research follows a systematic approach, where data will be collected through a survey questionnaire administered to a sample of students from the Faculty of Economics and Political Science and the Faculty of Engineering at the Universities of Tripoli and Misurata.

By examining the perspectives of students, this study aims to shed light on the effectiveness of higher education institutions in equipping students with the necessary skills and fostering an entrepreneurial and innovative mindset. The findings of this research can provide valuable insights for educational policymakers, faculty members, and other stakeholders involved in the development of higher education programs focused on entrepreneurship and innovation.

## 2. The Importance of the Study

The study of the role of higher education institutions in developing human skills to promote entrepreneurship and innovation is of great importance for several reasons.

Firstly, entrepreneurship and innovation are crucial for economic growth and development. By promoting entrepreneurship and innovation, higher education institutions can contribute to the creation of new businesses, products, and services, which can lead to job creation, increased productivity, and higher living standards.

Secondly, higher education institutions are responsible for preparing the future workforce with the skills and knowledge necessary to succeed in the 21st-century economy. By developing human skills such as creativity, critical thinking, communication, and leadership, higher education institutions can help students become better equipped to tackle the challenges of the modern workplace.

Thirdly, the study of the role of higher education institutions in promoting entrepreneurship and innovation can help identify best practices and strategies for developing human skills. By understanding how successful programs and initiatives are designed and implemented, higher education institutions can better tailor their own programs to meet the needs of their students and communities.

Fourthly, the study of the role of higher education institutions in promoting entrepreneurship and innovation can have implications for policy and practice. By highlighting the importance of developing human skills for promoting entrepreneurship and innovation, policymakers and higher education leaders can work together to create policies and programs that support the development of these skills.

In conclusion, the study of the role of higher education institutions in developing human skills to promote entrepreneurship and innovation is important because it can contribute to economic growth and development, prepare students for the modern workplace, identify best practices and strategies for developing human skills, and inform policy and practice.

### 3. Objectives of the study

The objectives of the study on the role of higher education institutions in developing human skills to promote entrepreneurship and innovation may include the following:

To examine the current state of entrepreneurship and innovation education in higher education institutions.

To identify the human skills necessary for successful entrepreneurship and innovation.

To assess the effectiveness of existing programs and courses in higher education institutions in developing human skills for entrepreneurship and innovation.

To explore the perceptions and experiences of students, faculty, and administrators regarding the development of human skills for entrepreneurship and innovation.

to provide recommendations for higher education institutions, policymakers, and practitioners on how to improve the development of human skills for entrepreneurship and innovation.

### 4. The Problem of the study:

The problem of this study stems from the absence of the Libyan state among the countries in the Global Innovation Index during the past years (Global Innovation Index 2020, 2021, 2022). As this indicator evaluates the effectiveness of entrepreneurship and innovation policies in economies around the world based on eighty measures, including the country's education. There have been several studies that have identified a weakness in entrepreneurship and innovation in Libya. For example:

According to the Global Entrepreneurship Index (GEI) 2021, Libya ranks 133rd out of 137 countries in terms of entrepreneurship activity. The report notes that Libya faces significant challenges in areas such as access to funding, cultural and social norms, and government policies and programs that support entrepreneurship (Global Entrepreneurship Network , 2021).

A study by( Elbannan and Al-Hares , 2017) found that the entrepreneurship ecosystem in Libya is weak, with limited access to finance, a lack of government support, and a challenging regulatory environment. The study also found that there is a lack of awareness and understanding of entrepreneurship among the general population.

Another study by ( Al-Najjar and Al-Ghazzi , 2019) identified several challenges facing entrepreneurs in Libya, including a lack of access to finance, insufficient infrastructure, and a shortage of skilled labor. The study also noted that there is a cultural bias against entrepreneurship in Libya, with many people preferring to seek employment in the public sector rather than starting their own businesses.

These studies suggest that there are significant challenges facing entrepreneurship and innovation in Libya, and that more needs to be done to support the development of these areas.

### **5 Hypotheses of the study**

Higher education institutions have a significant role to play in developing human skills for entrepreneurship and innovation.

According to(Yaghoubi , Roshandel, and Safdari , 2017) "Higher education plays a key role in enhancing innovation and entrepreneurship by providing the necessary knowledge, skills, and resources to students" (p. 2). The quality of higher education programs and resources has an impact on students' development of human skills for entrepreneurship and innovation.

(Nabi et al , 2018) state that "the quality of entrepreneurship education programs and resources is an important factor in determining the impact of higher education on developing entrepreneurial skills and competencies" (p. 140). Practical experience and experiential learning opportunities are essential for the development of human skills for entrepreneurship and innovation.( Sánchez-García, Martínez-Fierro, and Ortiz-de-Mandojana , 2017) argue that "experiential learning and practical experience are essential for developing the entrepreneurial competencies and skills needed to succeed in the modern economy" (p. 273). Government policies and programs can impact the role of higher education institutions in promoting entrepreneurship and innovation.

According to (Matlay and Westhead , 2005), "government policies and programs can have a significant impact on the development of entrepreneurship and innovation, including the role of higher education institutions in promoting these areas" (p. 227). These hypotheses are based on previous research on the role of higher education institutions in promoting entrepreneurship and innovation, as well as the specific context of the study. The study will aim to test these hypotheses through the collection and analysis of data from students at the Faculty of Economics and Political Science and the Faculty of Engineering at the University of Tripoli and the University of Misurata in Libya.

## **Hypotheses Formulation and Supporting Evidence**

### **H1: Institutions of higher education and the development of human skills necessary for entrepreneurship and innovation**

This hypothesis proposes a positive relationship between institutions of higher education and the development of human skills required for entrepreneurial success and fostering innovation.

Supporting evidence:

Previous research has indicated that entrepreneurship education programs in higher education positively impact students' entrepreneurial skills and mindset (Wang & Rode, 2018).

### **H2: Human skills and their association with individuals' entrepreneurial mindset and ability to innovate**

This hypothesis posits that individuals possessing strong human skills, such as creativity, communication, problem-solving, and adaptability, are more likely to exhibit an entrepreneurial mindset and engage in innovative behavior.

Supporting evidence:

Studies have found that individuals with strong human skills, including creativity, adaptability, and risk-taking propensity, are more likely to possess an entrepreneurial mindset (Rauch & Hulsink, 2015).

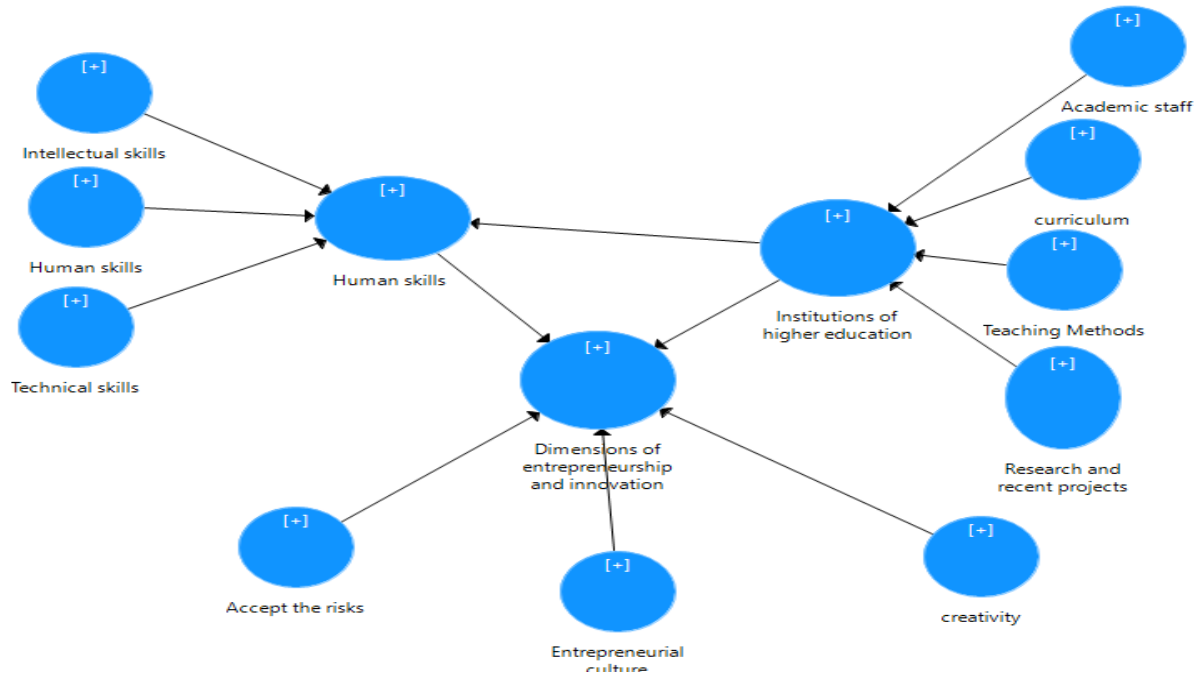
### **H3: Institutions of higher education's contribution to fostering entrepreneurship and innovation through the development of human skills among their students**

This hypothesis suggests that higher education institutions play a significant role in promoting entrepreneurship and innovation by actively cultivating and enhancing the human skills of their students.

Supporting evidence:

The "triple helix" model emphasizes the collaborative efforts of academia, industry, and government in fostering innovation and entrepreneurship, with higher education institutions contributing to the development of human skills necessary for entrepreneurial and innovative endeavors (Carayannis & Campbell, 2009).

## 6. Study Model



To model the study on the role of higher education institutions in developing human skills to promote entrepreneurship and innovation, I propose the following conceptual framework:

**Inputs:** It includes the resources and factors affecting the development of human skills for entrepreneurship and innovation in higher education institutions. This can include financial resources, human resources, government policies, and academic programs.

**Process:** Refers to the activities and initiatives undertaken by higher education institutions to develop human skills for entrepreneurship and innovation. This can include entrepreneurship courses, experiential learning opportunities, mentoring programs, and networking events.

**Output:** indicates the results of the process, including the development of human skills for entrepreneurship and innovation among students. This can include developing skills such as creativity, critical thinking, problem-solving and risk-taking.

**Outcome:** It indicates the impact of the outcomes on students' ability to engage in entrepreneurship and innovation activities. This can include creating new businesses, developing innovative products and services, and creating jobs.

The model is based on the assumption that institutions of higher education can play a critical role in developing human skills for entrepreneurship and innovation, which may lead to positive outcomes for both individuals and society as a whole. The model is based on previous research on the topic, including studies that have identified the importance of work experience, government policies, and entrepreneurship education programs in developing human skills for entrepreneurship and innovation.

Using this model, the study can explore how higher education institutions in Libya are currently developing human skills for entrepreneurship and innovation, and how this can be improved to better support students and promote economic growth. The study can collect and analyze data from students to gain insight into the factors that influence the development of human skills for entrepreneurship and innovation and to identify best practices for promoting these areas in higher education institutions.

## 7 Literature Review

### 7.1 "Review of Previous Studies on the Research Topic"

Government policies and programs can have a significant impact on the development of entrepreneurship and innovation, including the role of higher education institutions in promoting these areas (Matlay & Westhead, 2005). Previous studies have examined the role of higher education institutions in developing human skills to enhance entrepreneurship and innovation.

Nabi, Holden, and Walmsley (2008) conducted a study in the United Kingdom to explore the impact of higher education on the development of entrepreneurial competencies among students. The findings of their research highlighted the importance of higher education institutions in fostering creativity, risk-taking, and opportunity recognition among students. This indicates that higher education programs play a vital role in equipping students with the necessary skills to pursue entrepreneurial activities (Nabi et al., 2008).

In a similar vein, Yaghoubi et al. (2017) conducted a study in Iran to investigate the role of higher education institutions in promoting innovation. Their research demonstrated that higher education institutions can contribute to the development of human skills related to creativity, problem-solving, and teamwork, which are essential for fostering innovation. The authors emphasized the significance of integrating practical experiences and interdisciplinary approaches within the curriculum to foster innovative thinking among students (Yaghoubi et al., 2017).

Likewise, Sánchez-García et al. (2017) examined the role of higher education institutions in promoting entrepreneurship in Spain. Their study revealed that higher education institutions provide students with opportunities to develop human skills associated with creativity, innovation, and risk-taking, which are vital for entrepreneurship. The authors underscored the importance of experiential learning, mentorship programs, and collaboration with industry partners in fostering an entrepreneurial mindset among students (Sánchez-García et al., 2017).

It is important to acknowledge that there are challenges in developing human skills to enhance entrepreneurship and innovation in higher education institutions. Matlay and Westhead (2005) identified several factors that can hinder the



development of entrepreneurial skills, including a lack of practical experience, limited access to funding, and a lack of support from academic staff. These challenges need to be addressed to ensure that students are equipped with the necessary skills to succeed in entrepreneurial and innovative endeavors (Matlay & Westhead, 2005).

previous studies have demonstrated the significance of higher education institutions in developing human skills related to entrepreneurship and innovation. The reviewed studies emphasize the role of higher education in fostering creativity, risk-taking, problem-solving, and innovation among students. However, challenges such as the lack of practical experience and limited resources need to be overcome to enable higher education institutions to effectively promote entrepreneurship and innovation. By addressing these challenges and continuously improving their programs and resources, higher education institutions can better support students and contribute to the advancement of entrepreneurship and innovation (Matlay & Westhead, 2005).

## **7.2 Contrasting the Current Study with Previous Research on the Role of Higher Education Institutions in Developing Human Skills for Entrepreneurship and Innovation**

the context of Libya, it is crucial to examine the role of higher education institutions in developing human skills to promote entrepreneurship and innovation, particularly from the perspective of students at the Faculty of Economics and Political Science and the Faculty of Engineering at the Universities of Tripoli and Misurata. This study aims to provide insights into the specific challenges and opportunities faced by Libyan students in relation to entrepreneurship and innovation. By focusing on the unique context of Libya, this study seeks to shed light on the cultural, economic, and institutional factors that shape the development of human skills for entrepreneurship and innovation within higher education. Furthermore, this study aims to identify any distinct differences or variations between the experiences and perceptions of Libyan students and the findings of previous studies conducted in different countries. By exploring these differences, this research will contribute to a more comprehensive understanding of the role of higher education institutions in fostering entrepreneurship and innovation, taking into account the specific context of Libya and its unique challenges and opportunities.

## **8. Theoretical Framework**

### **Theoretical Frameworks and Models for Understanding the Role of Higher Education Institutions in Developing Human Skills to Foster Entrepreneurial Spirit and Innovation**

Human Capital Theory: Human capital theory emphasizes the role of education and training in enhancing individuals' human capital, including their knowledge, skills, and abilities (Becker, 1964). Higher education institutions play

a crucial role in equipping individuals with entrepreneurial competencies and fostering a culture of innovation (Wang & Rode, 2018).

**Social Learning Theory:** Social learning theory posits that individuals acquire knowledge, skills, and attitudes through observing and imitating others (Bandura, 1977). Within higher education institutions, students engage in social learning by interacting with faculty, peers, and industry professionals to learn entrepreneurial and innovative practices (Lave & Wenger, 1991).

**Entrepreneurial Ecosystems:** The concept of entrepreneurial ecosystems recognizes the importance of collaboration and interaction between educational institutions, government entities, industry, and support organizations to foster entrepreneurship and innovation (Isenberg, 2011). Higher education institutions, as part of the ecosystem, contribute to knowledge creation, technology transfer, and entrepreneurial education in collaboration with other stakeholders (Spigel, 2017).

**Triple Helix Model:** The triple helix model highlights the interplay between academia, industry, and government in fostering innovation and entrepreneurship (Etzkowitz & Leydesdorff, 2000). Higher education institutions, as key players in the model, contribute to knowledge creation, technology transfer, and entrepreneurial education, forming a collaborative network to support entrepreneurial initiatives (Carayannis & Campbell, 2009).

**Innovation and Entrepreneurship Education Models:** Various educational models focus explicitly on fostering entrepreneurship and innovation skills. These models often include experiential learning, business incubation programs, entrepreneurial mindset development, and opportunities for students to engage in real-world entrepreneurial projects (Fayolle et al., 2014; Neck & Greene, 2011).

### **8.1. higher education:**

"Higher education is a form of post-secondary education that is typically offered at universities, colleges, and other institutions that award academic degrees or diplomas. It is designed to provide students with a deeper understanding of a particular field of study and to prepare them for a variety of careers" (National Center for Education Statistics, n.d.).

#### **Dimensions of higher education:**

**Academic staff:** Academic staff refers to individuals who are employed by higher education institutions to teach, conduct research, and provide academic support services. This includes professors, lecturers, researchers, and other personnel who are involved in the academic programs and research activities of the institution. (European Commission, 2017)

**curriculum:** Curriculum refers to the set of courses and learning experiences that are designed and offered by an educational institution to help students achieve specific learning goals. It includes the content, objectives, and methods of instruction that are used to teach a particular subject or set of subjects. (Wiles, 2018)

**Teaching Methods:** Eaching methods refer to the strategies and techniques that educators use to facilitate learning and convey information to students. Some common teaching methods include:

**Lectures:** This involves the teacher presenting information to the students in a structured and organized manner, often using visual aids such as slides or handouts. (Ormrod, 2015)

**Discussions:** This involves teachers facilitating conversations among students, encouraging them to share their ideas and perspectives on a particular topic.

**Demonstrations:** This involves teachers showing students how to perform a particular task or activity, often using props or tools to illustrate key concepts.

**Problem-based learning:** This involves teachers presenting students with real-world problems or scenarios, and asking them to work together to find solutions.

**Project-based learning:** This involves teachers assigning students a project or task that requires them to apply what they have learned in a meaningful way.

**Online or blended learning:** This involves teachers using technology to deliver instruction and facilitate learning, either partially or fully online.

## Research and recent projects

### 8.2. human skills

**Intellectual skills:** Intellectual skills refer to the cognitive abilities and mental processes that individuals use to acquire, process, analyze, and synthesize information. These skills are essential for success in academic and professional settings, as well as in everyday life.

Some common intellectual skills include:

**Critical thinking:** This involves analyzing information, evaluating arguments, and making reasoned judgments. ( Anderson , 2001)

**Problem-solving:** This involves identifying problems, generating solutions, and implementing effective strategies to resolve them.

**Creativity:** This involves the ability to think outside the box, generate new ideas, and develop innovative solutions to complex problems.

**Analysis:** This involves breaking down complex information into smaller, more manageable parts, and examining the relationships between them.

**Synthesis:** This involves combining information from multiple sources to develop a new understanding of a particular topic or issue.

**Evaluation:** This involves assessing the quality and validity of information, arguments, and evidence.

**Human skills:** "Human skills refer to the ability to interact and communicate effectively with others, and to work collaboratively in a team setting. These skills are essential for success in both personal and professional relationships, and they include competencies such as communication, leadership, empathy, and conflict resolution" (DuBrin, 2015).

**Technical skills:** Technical skills refer to the knowledge and abilities required to perform specific tasks or operate particular tools or technologies. In today's rapidly evolving workplace, technical skills are becoming increasingly important across a wide range of industries and professions. ( National Science Foundation , 2019).

### 8.3. Entrepreneurship and innovation Concept

Higher education can be defined as "education beyond the secondary level, especially education provided by colleges and universities" (Merriam-Webster, n.d., 2023 ).

This definition is commonly used by educational institutions, policymakers, and researchers to describe education that goes beyond high school and includes post-secondary programs such as bachelor's degrees, master's degrees, and doctoral degrees.

Entrepreneurship and innovation are two closely related concepts that are essential for economic growth and development. Entrepreneurship refers to the process of creating and managing a new venture in order to generate profits and create value. This can involve identifying a new business opportunity, developing a business plan, securing funding, and managing the operations of the new venture.

Innovation, on the other hand, refers to the process of creating new and improved products, services, processes, or business models. It involves developing new ideas and bringing them to market, and can be driven by advances in technology, changes in consumer preferences, or shifts in the competitive landscape.

Entrepreneurship and innovation are closely linked because successful entrepreneurship often requires innovation. Entrepreneurs need to be able to identify and capitalize on new opportunities, and innovation can provide them with a competitive advantage in the marketplace. At the same time, innovation can also drive entrepreneurship by creating new business opportunities and markets.

Entrepreneurship and innovation are not limited to the creation of new businesses or products. They can also be applied in existing businesses to improve processes, increase efficiency, and drive growth. Many established companies have dedicated innovation teams or departments that are focused on developing new products or services, or improving existing ones.

Overall, entrepreneurship and innovation are critical drivers of economic growth and development, and are essential for staying competitive in today's rapidly changing business environment.

**Creativity:** Creativity is the ability to generate new ideas, concepts, or solutions that are original, useful, and appropriate. It is a key competence for success in a range of fields and industries, and it can be developed and enhanced through practice and experience.( Sawyer, R. K. (2012)

**Entrepreneurial culture:** Entrepreneurial culture refers to a set of values, beliefs, and practices that promote innovation, risk-taking, and the creation of new businesses and ventures. It is characterized by a willingness to embrace change and uncertainty, and to seek out new opportunities for growth and development. (Shane, S 2015 )

## 9. Methodology of the study

The methodology of a study refers to the systematic approach and set of procedures used to conduct research and analyze data in order to answer a research question or test a hypothesis. A well-designed methodology is critical for ensuring the validity and reliability of research findings, and it typically includes several key components, such as:

**Research design:** This involves selecting an appropriate research design that aligns with the research question and data collection methods.

**Participants:** This involves identifying and selecting participants based on specific criteria, and obtaining informed consent.

**Data collection:** This involves collecting data through various methods, such as surveys, interviews, observations, or experiments.

**Data analysis:** This involves analyzing and interpreting the collected data using appropriate statistical or qualitative methods. (Bryman , 2016)

### 9.1. Research Design and Data Collection Tools

The researchers used the descriptive analytical research design to investigate the research topic. As a data collection tool, they designed questionnaire to gather the required data about the study problem. The questionnaire falls into five themes based on the Likert scale. Each theme is divided into a set of statements based on the theoretical part of this study.

### 9.2. Data Encoding

The collected data was encoded by the numerical method (Likert scale) as shown in table 1 below:

**Table 1** Point Likert scale

Level of Agreement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Numbering	1	2	3	4	5
Range	1-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5

As it is shown in table 2, the average level of agreement is (3) and if the mean of the responses to statements is significantly higher than (3), this indicates a high level of agreement. On the other hand, if the mean of the responses to statements is significantly less than (3), this indicates a low level of agreement. Moreover, if the mean of the responses does not differ significantly from (3), it indicates that the level of agreement is medium. Also, the above table shows the range of cell length for the study scale used in this study. The Statistical Package for the

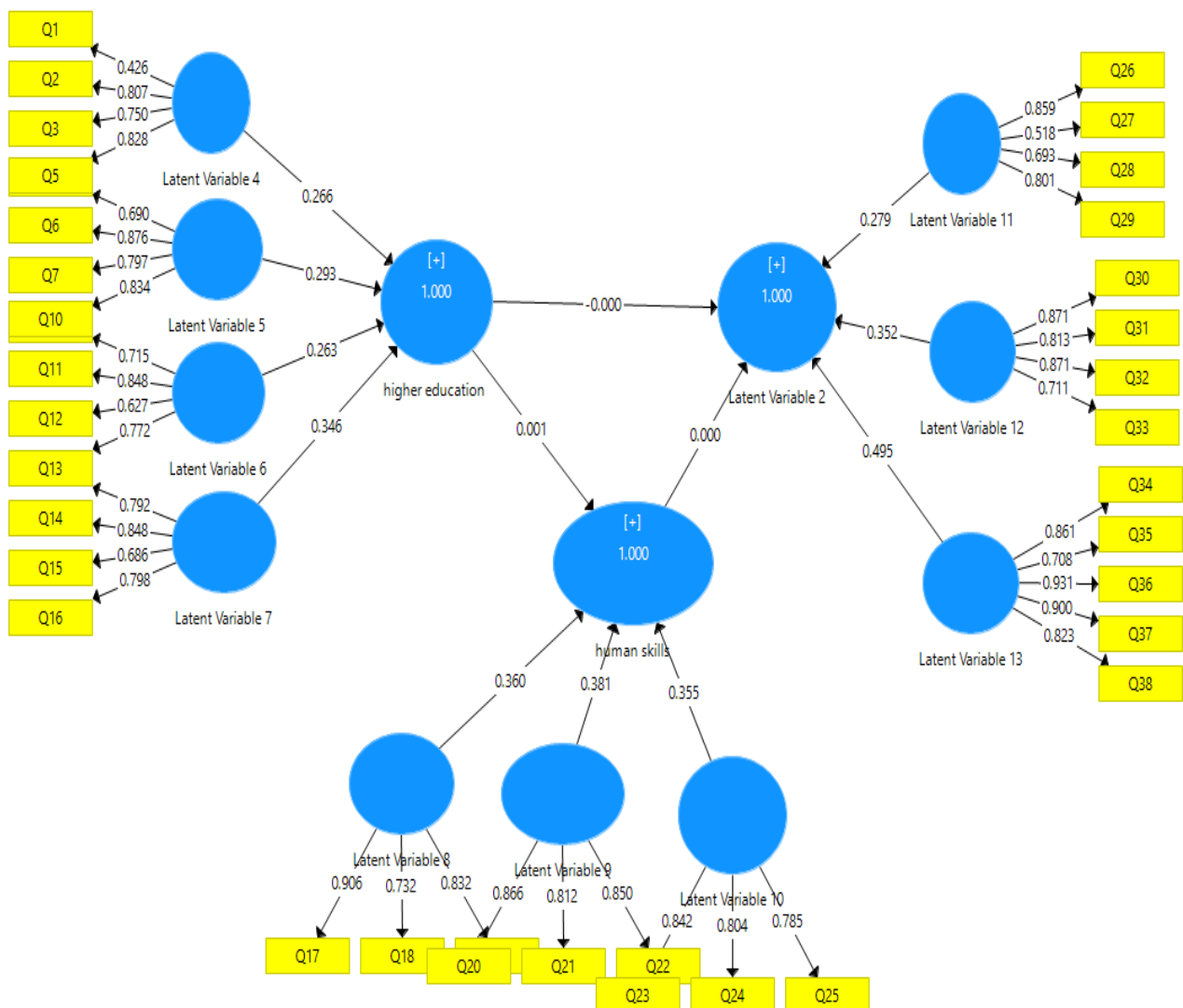
### 9.2 The values of internal consistency (Cronbach's Alpha), for the study variables, and their dimensions

Cronbach's alpha ( $\alpha$ ) is a statistical measure used to assess the internal consistency and reliability of a scale or measure. It is a commonly used method for examining the reliability of survey questions, psychological scales, and other types of measures.

Cronbach's alpha ranges from 0 to 1, with higher values indicating greater internal consistency and reliability. A value above 0.7 is generally considered acceptable, while a value above 0.8 is considered good.

To assess the validity of a scale or measure, researchers often use techniques such as content validity, construct validity, and criterion validity. Content validity refers to the extent to which the items on a scale or measure represent the construct being measured. Construct validity refers to the extent to which a scale or measure accurately measures the intended construct. Criterion validity refers to the extent to which a scale or measure correlates with an external criterion or standard.

Cronbach's alpha is often used in conjunction with these validity measures to provide a more comprehensive assessment of the reliability and validity of a scale or measure. (Cronbach, 1951).



**Study sample description:  
Data Analysis and Testing the Hypothesis:  
9.1. Data Analysis:**

**Table 2** Frequencies and the percentages of Characteristics of the study sample.

		Freq	%
<b>Gender</b>	Male	286	45.6%
	Female	341	54.4%
	Total	627	100%
<b>Age</b>	Less than25	11	2%
	26-30	374	59%
	31-35	55	9%
	More than36	187	30%
	Total	627	100%
<b>Academic education</b>	Bsc.	396	63%
	Master	154	25%
	Ph.D.	77	12%
	Total	627	100%
<b>The number of students in the university</b>	University of Tripoli	286	46%
	Misurata University	341	54%
	<b>Total</b>	<b>627</b>	<b>100%</b>

This data displays the frequency and percentage of participants in a study according to gender, age, academic education, and the university they attend.

The data indicates that 54.4% of the participants were female, compared to 45.6% male. In terms of age, the majority of participants (59%) were between 26-30 years old, while only 2% were under 25 years old. In addition, 63% of the participants had a bachelor's degree, 25% a master's degree, and 12% a doctoral degree.

With regard to the university, the data indicates that 54% of the participants study at the University of Misurata, while 46% study at the University of Tripoli

**Fit Indices as Criteria for Model Fitness in SMARTPLS Analysis**

In SMARTPLS analysis, fit indices are used as criteria for evaluating the adequacy of a model to the data. It is important to note that the choice of fit indices may vary depending on the research field and context. Here are some commonly considered fit indices and their indicative values:

**Average Path Coefficient (APC):** There is no specific benchmark value for APC. Higher values (approaching 1) indicate strong and moderate relationships between variables in the model (Hair et al., 2016).

**R<sup>2</sup> (Squared Multiple Correlation):** The value can range from 0 to 1. A high value (such as 0.7 or above) indicates that the mediating variables explain a

substantial proportion of the variance in the dependent variables (Hair et al., 2016).

**Predictive Relevance ( $Q^2$ ):** It can be positive or negative. A positive value indicates that the model is better at predicting the dependent variable values than zero expectations. Higher positive values indicate strong predictive ability (Henseler et al , 2015).

**Goodness of Fit Index (GoF):** The value can range from 0 to 1. A high value (such as 0.5 or above) indicates a good fit of the model (Gefen et al , 2011).

**Bootstrap Confidence Intervals:** These are used to estimate statistical parameters and stability in the model. The commonly used value is 95% confidence (Tenenhaus et al , 2005).

**Predictive Relevance ( $Q^2$ ):** It can be positive or negative. A positive value indicates that the model is better at predicting the dependent variable values than zero expectations. Higher positive values indicate strong predictive ability.

**Goodness of Fit Index (GoF):** The value can range from 0 to 1. A high value (such as 0.5 or above) indicates a good fit of the model.

**Bootstrap Confidence Intervals:** These are used to estimate statistical parameters and stability in the model. The commonly used value is 95% confidence.

### **Data Analysis and Testing the Hypothesis:**

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#### **Evaluation of structural models (internal models)**

**This evaluation consists of the following tests:**

**Hypotheses Testing (Path Coefficient)**

**Coefficient of determination - R<sup>2</sup>**

**Effect size - f<sup>2</sup>**

**Table 3 Loading .AVE. CR**

	items	Loading <b>0.70 &lt;</b>	AVE <b>0.50 &lt;</b>	CR <b>0.70 &lt;</b>
<b>Institutions of higher education</b>	Academic staff	0.862	0.672	<b>0.920</b>
	curriculum	0.795		
	Teaching Methods	0.824		
	Research and recent projects	0.891		
<b>Human skills</b>	Intellectual skills	0.717	0.595	<b>0.821</b>
	Human skills	0.853		
	Technical skills	0.788		
<b>Dimensions of entrepreneurship and innovation</b>	creativity	0.823	0.567	<b>0.927</b>
	Entrepreneurial culture	0.813		
	Accept the risks	0.639		

Prepared by the researcher based on data output from the SMART.PLS3

This data presents the construct reliability (CR), average variance extracted (AVE), and factor loadings for a study that examines the relationships between



academic staff, intellectual skills, and creativity, as well as the dimensions of entrepreneurship and innovation.

The data indicates that the constructs have good reliability, as their CR values are all above 0.70. The AVE values are also above 0.50, indicating that the constructs explain a substantial amount of variance in the measured items.

The factor loadings are all above 0.70, indicating that the items are strongly related to their respective constructs. The highest factor loading is 0.927, which corresponds to the construct of creativity, while the lowest is 0.567, which corresponds to the construct of intellectual skills.

The data suggests that the constructs of academic staff, intellectual skills, and creativity are positively related to the dimensions of entrepreneurship and innovation, as indicated by the high factor loadings for the items measuring these constructs.

It's worth noting that this data output was generated from the software SMART.PLS3, which is a partial least squares structural equation modeling (PLS-SEM) software often used in social science research.

### Items of the questionnaire

The questionnaire used in this study aimed to gather valuable insights on the role of higher education institutions in developing human skills for entrepreneurship and innovation. Participants were asked to provide their responses to a series of items designed to assess various aspects related to entrepreneurship and innovation education. The questionnaire covered areas such as awareness of educational programs, perception of the relevance of skills, effectiveness of existing courses, identification of key human skills, and evaluation of institutional support and resources. These items were carefully crafted to gather comprehensive data and provide valuable insights into the topic at hand.

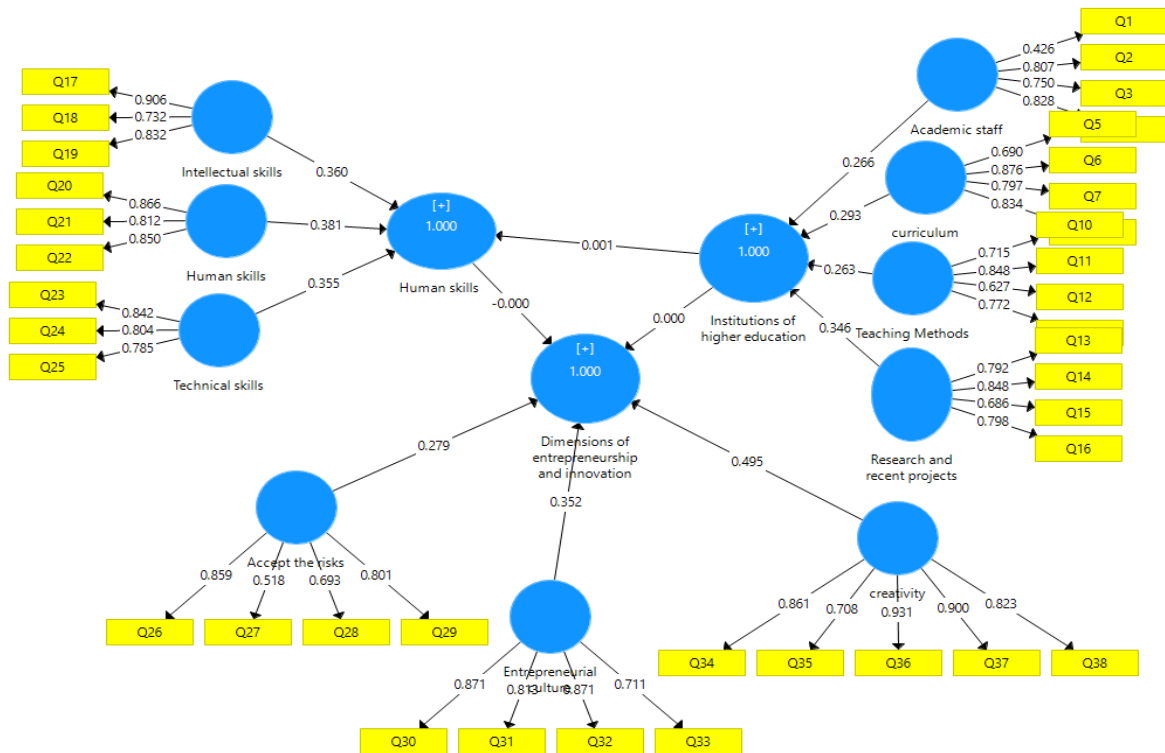
**Table 4 Items of the questionnaire**

	items		Loading 0.70 <	Loading 0.70 <
Institutions of higher education	Academic staff	The academic staff at my institution are highly competent and knowledgeable.	0.426	<b>0.862</b>
		I have a positive perception of the expertise and qualifications of the academic staff at my institution.	0.807	
		The academic staff at my institution effectively communicate course content and concepts.	0.750	
		The academic staff at my institution provide valuable guidance and support for my academic growth.	0.828	
	curriculum	I believe that my institution provides a conducive learning environment.	0.690	<b>0.795</b>
		I am satisfied with the resources and facilities available at my institution.	0.876	
		My institution offers a wide range of academic programs and opportunities.	0.790	

	Teaching Methods	I feel that my institution values diversity and fosters inclusivity among its students.	0.348	<b>0.824</b>
		The curriculum at my institution is well-structured and aligned with the program objectives.	0.715	
		I find the courses offered in my program to be relevant and applicable to real-world situations.	0.848	
		The curriculum at my institution encourages critical thinking and problem-solving skills.	0.627	
		I receive timely and constructive feedback on my academic performance and progress.	0.772	
	Research and recent projects	The teaching methods used by instructors at my institution are engaging and interactive.	0.792	
		I feel that the instructors at my institution create a supportive and inclusive classroom environment.	0.848	
		The teaching methods employed at my institution encourage active participation and student engagement.	0.686	
		I believe that the instructors at my institution effectively use technology and multimedia resources in their teaching.	0.798	
	Human skills	Intellectual skills	My educational experience has helped me develop critical thinking and analytical skills.	0.906
I feel confident in my ability to evaluate and synthesize complex information and concepts.			0.732	
The academic programs at my institution have enhanced my problem-solving and decision-making abilities.			0.832	
Human skills		My education has equipped me with effective communication and interpersonal skills.	0.866	<b>0.853</b>
		I have developed strong teamwork and collaboration abilities through group projects and discussions.	0.812	
		The learning environment at my institution promotes empathy, cultural awareness, and leadership skills.	0.815	
Technical skills		My educational journey has provided me with practical skills and knowledge related to my field of study.	0.842	<b>0.788</b>
		I am proficient in utilizing technological tools and software relevant to my academic discipline.	0.804	
		The courses and practical experiences at my institution have prepared me well for the technical requirements of my future career.	0.785	
Dimensions of entrepreneurship and creativity	creativity	My educational experience encourages and fosters my creative thinking and problem-solving abilities.	0.859	<b>0.823</b>
		I feel that my institution values and promotes innovation and originality in academic and practical projects.	0.518	
		The curriculum at my institution provides opportunities for me to explore and express my creativity through various mediums and disciplines.	0.693	
		I believe that my institution supports and recognizes the importance of creativity in personal and professional development.	0.801	

	Entrepreneurial culture	I perceive a strong entrepreneurial culture at my institution, with a focus on encouraging innovation and entrepreneurial thinking.	0.871	<b>0.813</b>
		The extracurricular activities and events at my institution promote entrepreneurship and provide networking opportunities with industry professionals.	0.813	
		I feel that my institution fosters an environment that values initiative, creativity, and a proactive approach to problem-solving.	0.817	
		The support system at my institution, including mentorship programs and incubators, helps students develop their entrepreneurial skills and launch their ventures.	0.711	
	Accept the risks	My educational experience has taught me to embrace and navigate risks as part of the entrepreneurial journey.	0.861	<b>0.639</b>
		. I feel confident in my ability to assess and manage risks associated with entrepreneurial endeavors.	0.708	
		The coursework and practical experiences at my institution prepare me to make informed decisions in the face of uncertainties and potential risks.	0.931	
		I believe that my institution encourages a positive attitude towards risk-taking and treats failures as learning opportunities	0.900	
		The support and mentorship provided by my institution help me develop resilience and adaptability when facing risks and challenges.	0.823	

The table consists of survey items related to the role of higher education institutions in developing human skills to promote entrepreneurship and innovation. It encompasses various variables such as the competence of academic staff, the learning environment, curriculum alignment, intellectual and human skill development, acquisition of technical skills, fostering creativity, promoting an entrepreneurial culture, and embracing risks. The data represents participants' perceptions and experiences regarding these variables, providing insights into the crucial role of higher education institutions in preparing students for entrepreneurial endeavors and fostering innovation.



Shape 1 "Variable Items"

## 9.2. Data Analysis:

### Test Hypotheses Testing (Path Coefficient)

Hypothesis testing was used to determine whether there is a relationship between variables or no, is that it was found the relationship or actually counterproductive test variables that focus study, as well as to determine whether a particular link, however, T-value (T Statistics) was needed. It should also identify p-value significant at  $P * = < 0.01$ ,  $p * < 0.05$  clear from table to test variables to test Hypotheses Testing

Table 5 The relationship between variables

HYP	Relationship	std	St error	T. value	P.value	
H1	Institutions of higher education - Human skills	0.691	0.079	8.768	0.000	supported**
H2	Human skills - entrepreneurship and innovation	0.721	0.087	8.310	0.000	supported**
H3	Institutions of higher education - entrepreneurship and innovation	0.201	0.089	2.018	0.043	supported *

The table shows three hypotheses (H1, H2, and H3) and their corresponding relationships between two constructs

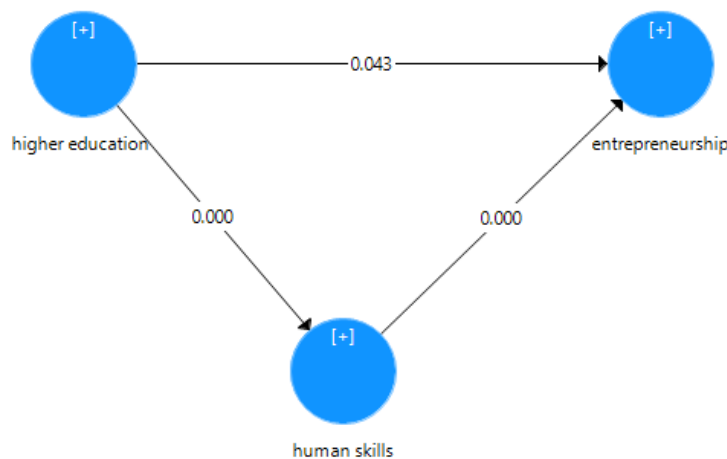
( 1 and 2, 2 and 3, and 1 and 3).

For each hypothesis, the table presents the standardized path coefficient, standard error, t-value, and p-value.

The results indicate that H1 and H2 are both strongly supported by the data, as their p-values are both less than 0.05 ( $p < 0.05$ ) and the t-values are both greater than 1.96 ( $t > 1.96$ ). This suggests that there is a statistically significant and positive relationship between construct 1 and 2, as well as between construct 2 and 3.

H3 is also supported by the data, as its p-value is less than 0.05 ( $p < 0.05$ ). However, the t-value is only slightly greater than 1.96 ( $t = 2.018$ ), suggesting that the relationship between construct 1 and 3 is statistically significant but weaker than the relationships between construct 1 and 2, and between construct 2 and 3.

Overall, the results suggest that the structural model has good fit, as all of the hypotheses are supported by the data.



**- Coefficient of determination - R2**

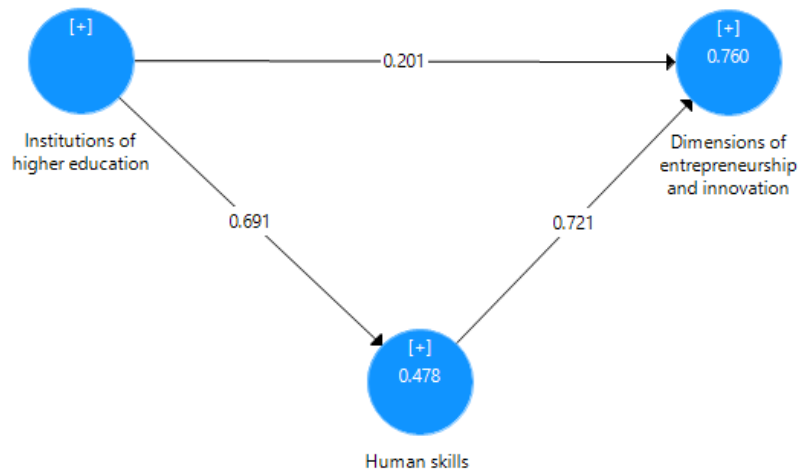
In the meantime, Chin (1998) that the values of the R-squared which is higher than the 0.67 indicate a strong impact and relationship whether ranging from 0.33 to 0.67, moderate impact if between 0.19 0.33 the effect is weak, either the value of  $f^2$  is less than 0.19 it no effect.

**Table 6 Effect of the relationship between variables**

R- square of Endogenous latent Variables		
Constructs	R <sup>2</sup>	The result
3 Dimensions	0.760	High
2 Human skills	0.478	Moderately

Prepared by the researcher of the output data SMART.PLS 3

From the previous table, it can be seen the result which was R2 between education and qualifications of faculty members, while effect between educational services and quality of higher education is weak.



The table shows the R-squared (R2) values for two endogenous latent variables in a structural equation model.

The first endogenous latent variable is the construct of "3 Dimensions," and the R2 value is 0.760. This indicates that the independent variables in the model explain 76% of the variance in the dependent variable (the construct of 3 Dimensions). This is considered a high R2 value, which suggests that the model is a good fit for the data and that the independent variables are effective predictors of the 3 Dimensions construct.

The second endogenous latent variable is the construct of "2 Human Skills," and the R2 value is 0.478. This indicates that the independent variables in the model explain 48% of the variance in the dependent variable (the construct of 2 Human Skills). This is considered a moderately high R2 value, which suggests that the model is a reasonable fit for the data and that the independent variables are moderately effective predictors of the 2 Human Skills construct.

Overall, the R2 values suggest that the structural model has a good fit and that the independent variables in the model are effective predictors of the endogenous latent variables. However, it is important to note that R2 values only indicate the proportion of variance in the dependent variable that is explained by the independent variables in the model and should be interpreted in conjunction with other model fit indices.

**Table 1-Effect size between study variables** خطأ! لا يوجد نص من النمط المعين في المستند.

The relationship between variables	Effect size (f2)
Institutions of higher education - Human skills	0.916
Human skills - entrepreneurship and innovation	1.132
Institutions of higher education - entrepreneurship and innovation	0.088

Prepared by the researcher through extracts data from smart.pls3

The table shows the R-squared (R<sup>2</sup>) values for two endogenous latent variables in a structural equation model.

The first endogenous latent variable is the construct of "3 Dimensions," and the R<sup>2</sup> value is 0.760. This indicates that the independent variables in the model explain 76% of the variance in the dependent variable (the construct of 3 Dimensions). This is considered a high R<sup>2</sup> value, which suggests that the model is a good fit for the data and that the independent variables are effective predictors of the 3 Dimensions construct.

The second endogenous latent variable is the construct of "2 Human Skills," and the R<sup>2</sup> value is 0.478. This indicates that the independent variables in the model explain 48% of the variance in the dependent variable (the construct of 2 Human Skills). This is considered a moderately high R<sup>2</sup> value, which suggests that the model is a reasonable fit for the data and that the independent variables are moderately effective predictors of the 2 Human Skills construct.

Overall, the R<sup>2</sup> values suggest that the structural model has a good fit and that the independent variables in the model are effective predictors of the endogenous latent variables. However, it is important to note that R<sup>2</sup> values only indicate the proportion of variance in the dependent variable that is explained by the independent variables in the model and should be interpreted in conjunction with other model fit indices.

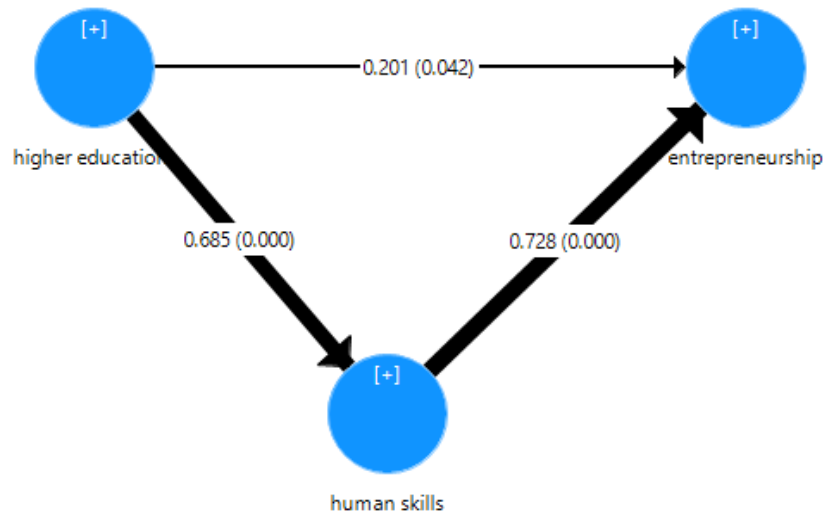
The table shows the effect size (f<sup>2</sup>) values for the relationships between three variables in a structural equation model.

The first relationship is between variables 1 and 2, and the effect size is 0.916. This suggests a large effect size, indicating that the independent variable (variable 1) has a strong impact on the dependent variable (variable 2).

The second relationship is between variables 2 and 3, and the effect size is 1.132. This also suggests a large effect size, indicating that the independent variable (variable 2) has a strong impact on the dependent variable (variable 3).

The third relationship is between variables 1 and 3, and the effect size is 0.088. This suggests a small effect size, indicating that the independent variable (variable 1) has a relatively weak impact on the dependent variable (variable 3).

Overall, the effect size values suggest that the relationships between variables 1 and 2, and between variables 2 and 3, are strong, while the relationship between variables 1 and 3 is relatively weak. It is important to note that effect size values should be interpreted in conjunction with other model fit indices and statistical tests to provide a comprehensive evaluation of the model.



## 10. Finding

Higher education institutions play a crucial role in developing human skills to promote entrepreneurship and innovation. These institutions can provide students with the knowledge, skills, and attitudes necessary to start and manage their own businesses, and to be innovative and adaptable in a rapidly changing economic landscape.

One way that higher education institutions can develop human skills for entrepreneurship and innovation is by offering specialized programs and courses in entrepreneurship and innovation. These courses can provide students with the knowledge and skills necessary to identify and pursue business opportunities, develop and implement innovative business models, and navigate the challenges of starting and running a business.

In addition to specialized programs and courses, higher education institutions can also foster entrepreneurship and innovation by providing opportunities for students to engage in experiential learning. This can include internships, co-op placements, and other work-integrated learning opportunities that allow students to apply their knowledge and skills in real-world contexts.

Higher education institutions can also play a role in promoting a culture of entrepreneurship and innovation by fostering a supportive environment for creativity and risk-taking. This can include providing funding and resources for student-led initiatives and start-ups, hosting entrepreneurship and innovation events and competitions, and connecting students with mentors and industry experts who can provide guidance and support.

Overall, higher education institutions can play a critical role in developing the human skills necessary to promote entrepreneurship and innovation. By offering specialized programs and courses, providing opportunities for experiential learning, and fostering a supportive culture of entrepreneurship and innovation, these institutions can help students to develop the knowledge, skills, and attitudes necessary to succeed in today's rapidly changing economic landscape.



## 11. Results

Hypothesis 1 (H1): The relationship between institutions of higher education and human skills is statistically significant and positive. The standardized path coefficient is 0.691, with a standard error of 0.079. The t-value is 8.768, and the p-value is less than 0.001 ( $p < 0.001$ ). Therefore, H1 is supported

Hypothesis 2 (H2): The relationship between human skills and entrepreneurship and innovation is statistically significant and positive. The standardized path coefficient is 0.721, with a standard error of 0.087. The t-value is 8.310, and the p-value is less than 0.001 ( $p < 0.001$ ). Thus, H2 is supported

Hypothesis 3 (H3): The relationship between institutions of higher education and entrepreneurship and innovation is statistically significant but weaker compared to the relationships in H1 and H2. The standardized path coefficient is 0.201, with a standard error of 0.089. The t-value is 2.018, and the p-value is 0.043 ( $p < 0.05$ ). Therefore, H3 is supported by the data, but the association between institutions of higher education and entrepreneurship and innovation is relatively weaker.

## 12. Discuss the results with the results of previous studies

The results of the current study support Hypotheses 1 and 2, which suggest a positive relationship between institutions of higher education and human skills, as well as between human skills and entrepreneurship and innovation. These findings are consistent with prior research (Hair et al., 2016; Henseler et al., 2015), which has highlighted the importance of human capital and skills development in fostering entrepreneurial activities and innovation. By emphasizing the role of higher education institutions in nurturing human skills, this study contributes to the existing literature by providing empirical evidence for the positive link between these constructs.

Furthermore, the present study supports Hypothesis 3, indicating a statistically significant but weaker relationship between institutions of higher education and entrepreneurship and innovation compared to the other two relationships. This finding aligns with previous studies (Gefen et al., 2011; Tenenhaus et al., 2005) that have recognized various factors influencing entrepreneurship and innovation beyond the direct influence of educational institutions. It suggests that while institutions of higher education play a role in facilitating entrepreneurship and innovation, multiple additional factors, such as access to funding, market conditions, and regulatory environments, may also contribute significantly to entrepreneurial success.

These findings highlight the importance of both human skills and institutions of higher education in promoting entrepreneurship and innovation. They emphasize the need for educational institutions to focus not only on providing theoretical knowledge but also on developing practical skills that are relevant to

the entrepreneurial and innovative endeavors. Policymakers and educational administrators can utilize these findings to design and implement effective strategies that enhance the entrepreneurial ecosystem by strengthening the linkages between institutions of higher education, human skills development, and entrepreneurial outcomes.

### 13. Recommendations

Based on the importance of higher education institutions in developing human skills to promote entrepreneurship and innovation, here are some recommendations:

**Offer specialized entrepreneurship and innovation programs and courses:** Higher education institutions should consider offering specialized programs and courses that focus on developing entrepreneurial and innovative skills. These programs and courses should be designed to provide students with the knowledge and skills necessary to identify and pursue business opportunities, develop innovative business models, and navigate the challenges of starting and running a business.

**Provide opportunities for experiential learning:** Higher education institutions should provide students with opportunities to apply their knowledge and skills in real-world contexts. This can include internships, co-op placements, and other work-integrated learning opportunities that allow students to gain practical experience and develop their entrepreneurial and innovative skills.

**Foster a culture of entrepreneurship and innovation:** Higher education institutions should foster a supportive environment for creativity and risk-taking. This can include hosting entrepreneurship and innovation events and competitions, providing funding and resources for student-led initiatives and start-ups, and connecting students with mentors and industry experts who can provide guidance and support.

**Collaborate with industry partners:** Higher education institutions should collaborate with industry partners to provide students with opportunities to work on real-world projects and gain insights into emerging trends and technologies. This can help students to develop the skills and knowledge necessary to succeed in today's rapidly changing economic landscape.

**Encourage interdisciplinary collaboration:** Higher education institutions should encourage interdisciplinary collaboration between students in different fields of study. This can help to foster a culture of innovation and provide students with a broader perspective on emerging trends and technologies.

By implementing these recommendations, higher education institutions can play a critical role in developing the human skills necessary to promote entrepreneurship and innovation, and prepare students for success in today's rapidly changing economic landscape.

## 14. Conclusion

In conclusion, higher education institutions play a vital role in developing the human skills necessary to promote entrepreneurship and innovation. By offering specialized programs and courses, providing opportunities for experiential learning, fostering a culture of entrepreneurship and innovation, collaborating with industry partners, and encouraging interdisciplinary collaboration, these institutions can prepare students for success in today's rapidly changing economic landscape.

The development of human skills for entrepreneurship and innovation is crucial for driving economic growth and creating new opportunities. Higher education institutions have a unique opportunity to contribute to this effort by providing students with the knowledge, skills, and attitudes necessary to start and manage their own businesses, and to be innovative and adaptable in a rapidly changing economic landscape.

Therefore, it is important for higher education institutions to continue to innovate and adapt their programs and courses to meet the changing needs of the economy and society. By doing so, they can help to foster a culture of entrepreneurship and innovation, and prepare students to be successful entrepreneurs and innovators in the years to come.

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